Proposed amendment

Electricity transmission network service providers

Roll forward model handbook

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Amendment record

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1	September 2007	24
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Contents

Shortened forms

AER	Australian Energy Regulator
capex	capital expenditure
CPI	consumer price index
NEL	National Electricity Law
NER	National Electricity Rules
PTRM	post-tax revenue model
RAB	regulatory asset base
RFM	roll forward model
TNSP	transmission network service provider
WACC	weighted average cost of capital

1. Nature and authority

1.1 Introduction

This handbook sets out the Australian Energy Regulator's (AER) roll forward model (RFM) for electricity transmission network service providers (TNSPs). Amendments made in this handbook are shaded in yellow. The RFM is a series of Microsoft Excel spreadsheets (2003 version) developed in accordance with the requirements of clause 6A.6.1 of the National Electricity Rules (NER).

1.2 Authority

Clause 6A.6.1(b) of the NER requires the AER to develop and publish the RFM, in accordance with the transmission consultation procedures.

1.3 Role of the model

The RFM is used by the AER to determine the closing regulatory asset base (RAB) for a regulatory control period. The closing RAB value for a regulatory control period as calculated by the RFM becomes the opening RAB to be used for the purposes of making a revenue determination for the next regulatory control period. The roll forward of the opening RAB for the next regulatory control period, on a forecast indicative basis, is undertaken in the AER's post-tax revenue model (PTRM) in accordance with the requirements of the NER.

1.4 Confidentiality

The AER's obligations regarding confidentiality and the disclosure of information provided to it by a TNSP are governed by the *Trade Practices Act 1974*, the National Electricity Law (NEL) and the NER.

1.5 Process for revision

The AER may amend or replace the RFM from time to time in accordance with clause 6A.6.1(c) of the NER and the transmission consultation procedures. An amended version of this handbook will accompany each amended version of the RFM.

1.6 Version history and effective date

A version number and an effective date of issue will identify each version of this handbook.

2. The model

The RFM is a set of Microsoft Excel spreadsheets (2003 version) which perform calculations to derive a closing RAB for the current regulatory control period from a given set of inputs. The RFM allows the user to vary the inputs in order to assess their impact on the output data and other derived parameters.

2.1 Input sheet

The **Input** sheet provides for key input variables to be entered in the RFM. They are automatically linked to corresponding cells in the relevant sheets. Values should be entered into each cell that has light blue shading. This sheet has been split into eight sections:

- opening RAB
- actual nominal capital expenditure (capex)—as-incurred
- actual nominal asset disposals—as-incurred
- actual real net capex—as-incurred
- actual nominal capex—as-commissioned
- actual nominal asset disposals—as-de-commissioned
- actual real net capex—as-commissioned
- inflation and rate of return.

The input data to be recorded in the RFM must be in a consistent format as the data collected from the TNSP in accordance with the AER's submission guidelines.

Figure 1 provides an example of the **Input** sheet.

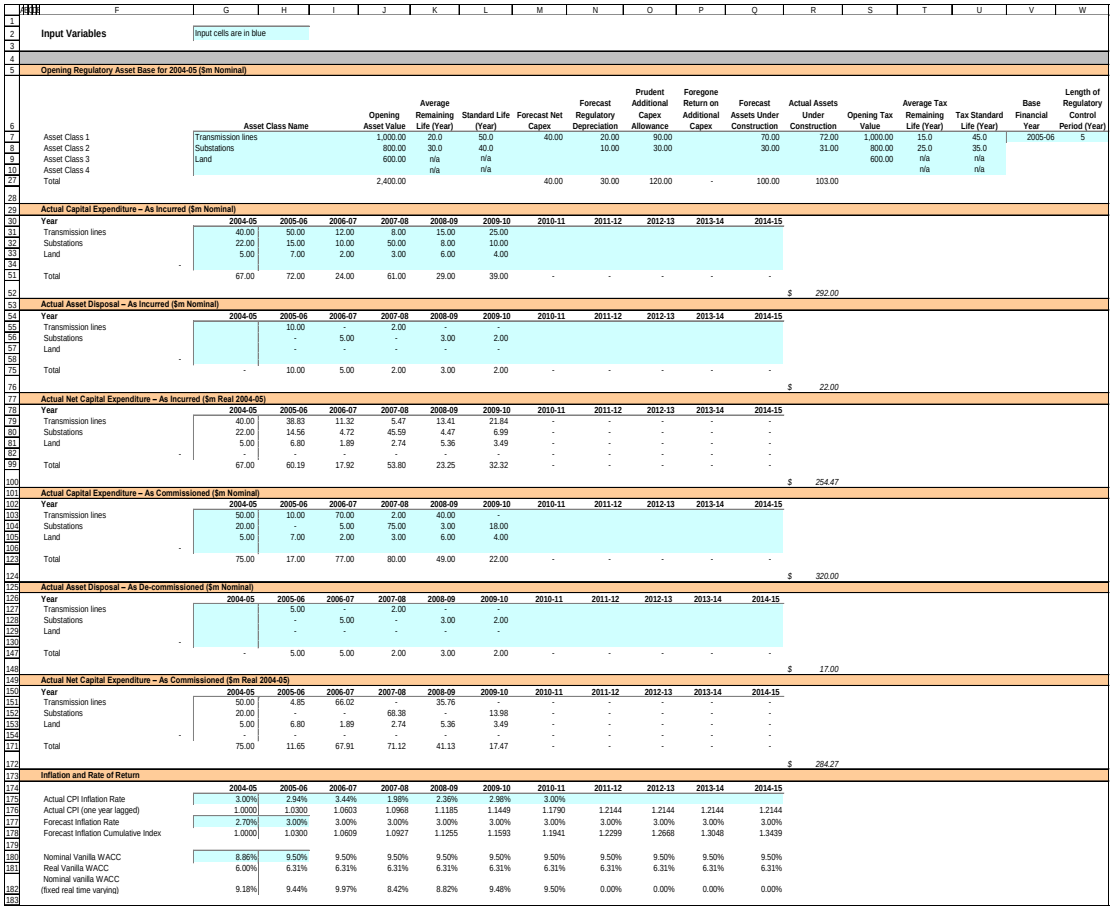
The RFM can handle input data for up to an 11-year period. This includes the final year of the previous regulatory control period, as well as up to 10 years of the current regulatory control period.[1] The RFM can be adjusted to account for regulatory control periods of longer duration.

[1] For a standard (shorter) regulatory control period, the input spaces which are not required should be left or have zero as an input.

The RFM is configured to use the straight-line method as the default position for calculating depreciation. TNSPs may propose depreciation profiles other than the straight-line method to be accommodated within the RFM in consultation with the AER as part of pre-lodgement discussions and subject to satisfying the requirements at clause 6A.6.3(b) of the NER.

The RFM is also configured to recognise capex on a partially as-incurred (hybrid) approach. This method for recognising capex calculates the return on capital based on an as-incurred approach and the return of capital (depreciation) is based on an as-commissioned approach. As such, two RABs determined on the basis of as-incurred capex and as-commissioned capex are required to be calculated by the RFM.

Figure 1: Input sheet



Input Variables

Input cells are in blue

Opening Regulatory Asset Base for 2004-05 ($m Nominal)

	Asset Class Name	Opening Asset Value	Average Remaining Life (Year)	Standard Life (Year)	Forecast Net Capex	Forecast Regulatory Depreciation	Prudent Additional Capex Allowance	Foregone Return on Additional Capex	Forecast Assets Under Construction	Actual Assets Under Construction	Opening Tax Value	Average Tax Remaining Life (Year)	Tax Standard Life (Year)	Base Financial Year	Length of Regulatory Control Period (Year)
Asset Class 1	Transmission lines	1,000.00	20.0	50.0	40.00	20.00	90.00		70.00	72.00	1,000.00	15.0	45.0	2005-06	5
Asset Class 2	Substations	800.00	30.0	40.0		10.00	30.00		30.00	31.00	800.00	25.0	35.0		
Asset Class 3	Land	600.00	n/a	n/a							600.00	n/a	n/a		
Asset Class 4			n/a	n/a								n/a	n/a		
Total		2,400.00			40.00	30.00	120.00	-	100.00	103.00					

Actual Capital Expenditure – As Incurred ($m Nominal)

Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	
Transmission lines	40.00	50.00	12.00	8.00	15.00	25.00						
Substations	22.00	15.00	10.00	50.00	8.00	10.00						
Land	5.00	7.00	2.00	3.00	6.00	4.00						
Total	67.00	72.00	24.00	61.00	29.00	39.00	-	-	-	-	-	
												$ 292.00

Actual Asset Disposal – As Incurred ($m Nominal)

Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	
Transmission lines		10.00	-	2.00	-	-						
Substations		-	5.00	-	3.00	2.00						
Land		-	-	-	-	-						
Total	-	10.00	5.00	2.00	3.00	2.00	-	-	-	-	-	
												$ 22.00

Actual Net Capital Expenditure – As Incurred ($m Real 2004-05)

Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	
Transmission lines	40.00	38.83	11.32	5.47	13.41	21.84	-	-	-	-	-	
Substations	22.00	14.56	4.72	45.59	4.47	6.99	-	-	-	-	-	
Land	5.00	6.80	1.89	2.74	5.36	3.49	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	
Total	67.00	60.19	17.92	53.80	23.25	32.32	-	-	-	-	-	
												$ 254.47

Actual Capital Expenditure – As Commissioned ($m Nominal)

Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	
Transmission lines	50.00	10.00	70.00	2.00	40.00	-						
Substations	20.00	-	5.00	75.00	3.00	18.00						
Land	5.00	7.00	2.00	3.00	6.00	4.00						
	-	-	-	-	-	-						
Total	75.00	17.00	77.00	80.00	49.00	22.00	-	-	-	-	-	
												$ 320.00

Actual Asset Disposal – As De-commissioned ($m Nominal)

Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	
Transmission lines		5.00	-	2.00	-	-						
Substations		-	5.00	-	3.00	2.00						
Land		-	-	-	-	-						
	-	-	-	-	-	-						
Total	-	5.00	5.00	2.00	3.00	2.00	-	-	-	-	-	
												$ 17.00

Actual Net Capital Expenditure – As Commissioned ($m Real 2004-05)

Year	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	
Transmission lines	50.00	4.85	66.02	-	35.76							
Substations	20.00	-	-	68.38	-	13.98	-	-	-	-	-	
Land	5.00	6.80	1.89	2.74	5.36	3.49	-	-	-	-	-	
	-	-	-	-	-	-	-	-	-	-	-	
Total	75.00	11.65	67.91	71.12	41.13	17.47	-	-	-	-	-	
												$ 284.27

Inflation and Rate of Return

	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Actual CPI Inflation Rate	3.00%	2.94%	3.44%	1.98%	2.36%	2.98%	3.00%				
Actual CPI (one year lagged)	1.0000	1.0300	1.0603	1.0968	1.1185	1.1449	1.1790	1.2144	1.2144	1.2144	1.2144
Forecast Inflation Rate	2.70%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
Forecast Inflation Cumulative Index	1.0000	1.0300	1.0609	1.0927	1.1255	1.1593	1.1941	1.2299	1.2668	1.3048	1.3439
Nominal Vanilla WACC	8.86%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%	9.50%
Real Vanilla WACC	6.00%	6.31%	6.31%	6.31%	6.31%	6.31%	6.31%	6.31%	6.31%	6.31%	6.31%
Nominal vanilla WACC (fixed real time varying)	9.18%	9.44%	9.97%	8.42%	8.82%	9.48%	9.50%	0.00%	0.00%	0.00%	0.00%

Opening regulatory asset base

The opening RAB is the value of assets on which a return will be earned. The **Input** sheet requires values for the opening RAB (broken into asset classes) at the start of the final year of the previous regulatory control period. The RAB will differ each year to reflect actual capex (as-incurred), asset disposals and regulatory depreciation.

The recorded input values are linked to subsequent sheets which calculate a running balance of the RAB for the current regulatory control period. Notes have also been

included for various cells with specific comments and explanations about the relevance of the inputs.

Asset class name

The asset classes/names are recorded in column G. It is important that the number of asset classes recorded in the RAB section matches the number of asset classes identified in the capex section. This allows the RFM to model consistent depreciation across the asset classes.

The RFM is configured to accommodate up to 20 asset classes.[2] The number of asset classes used in the RFM will vary between businesses. However, for each business, the number of asset classes used in the RFM must be consistent with that used in the AER's post-tax revenue model (PTRM) to allow the closing RAB values determined in the RFM to be used as inputs to the opening RAB values in the PTRM.

Opening asset value

The opening asset values for each asset class are recorded in column J. These values should be as at the start of the final year of the previous regulatory control period.

Average remaining life

The remaining lives of each asset class are recorded in column K, based on the economic lives of the assets as at the start of the current regulatory control period. These values should be consistent with those used in the current revenue determination for the TNSP.

Standard life

The standard lives of each asset class are recorded in column L and measure how long the infrastructure would physically last had it just been built. These values should be consistent with those used in the current revenue determination for the TNSP.

Forecast net capex

The forecast net capex values for each asset class are recorded in column M. They are based on the forecasts made in the final year of the previous regulatory control period. These values would be contained in the RFM used for the current revenue determination for the TNSP. The forecast net capex values are linked to the **Adjustment for previous period** sheet.

[2] The RFM can be expanded to accommodate additional asset classes, when necessary.

Forecast regulatory depreciation

The forecast regulatory depreciation values for each asset class are recorded in column N. They are based on the forecasts made for the final year of the previous regulatory control period. These values would be contained in the RFM used for the current revenue determination for the TNSP. The forecast regulatory depreciation values are linked to the **Adjustment for previous period** sheet.

Prudent additional capex allowance

The prudent additional capex allowance values for each asset class are recorded in column O. This data may be required for TNSPs where the allowance was added to the closing RAB for the previous regulatory control period. The amount of prudent additional capex allowance (if any) would be contained in the RFM used for the current revenue determination for the TNSP. The prudent additional capex allowance values are linked to the **Adjustment for previous period** sheet.

Foregone return on additional capex

The foregone return on additional capex values for each asset class are recorded in column P. This data may be required for TNSPs where, in the case of a capex overspend, the foregone return associated with the amount of prudent additional capex allowed in the previous regulatory control period was added to the closing RAB for the previous regulatory control period. The amount of foregone return on additional capex (if any) would be contained in the RFM used for the current revenue determination for the TNSP. The foregone return on additional capex values are linked to the **Adjustment for previous period** sheet.

Forecast assets under construction

The forecast assets under construction values for each asset class during the final year of the previous regulatory control period are recorded in column Q. This data may be required for TNSPs transitioning to recognising capex on a partially as-incurred approach during the previous regulatory control period. In this case, forecast assets under construction values would have been added to the closing RAB for the previous regulatory control period. The amount of forecast assets under construction (if any) would be contained in the RFM used for the current revenue determination for the TNSP.[3] The forecast assets under construction values are linked to the **Adjustment for previous period** sheet.

Actual assets under construction

The actual assets under construction values for each asset class during the final year of the previous regulatory control period are recorded in column R. This data may be

[3] Alternatively, the forecast assets under construction values may be obtained from the opening asset base input in the PTRM used for the current revenue determination for the TNSP.

required for TNSPs transitioning to recognising capex on a partially as-incurred approach during the previous regulatory control period. These actual assets under construction values are linked to the **Adjustment for previous period** sheet.

Tax asset values—opening tax value, average tax remaining life, tax standard life

The RFM includes a mechanism to roll forward tax asset values between regulatory control periods. The **Input** sheet requires the tax asset values comprising of the opening tax values, average tax remaining lives and tax standard lives for each asset class. The tax asset values will differ each year to reflect actual capex (as-commissioned), asset disposals and tax depreciation.

For each asset class, the opening tax values at the start of the final year of the previous regulatory control period are recorded in column S, the average tax remaining lives are recorded in column T and the tax standard lives are recorded in column U. These input values are linked to the **Tax asset roll forward** sheet to calculate a running balance of the tax asset values for the regulatory control period.

Base financial year

The financial year for the start of the current regulatory control period is recorded in cell V7.

Length of the current regulatory control period

The number of years in the current regulatory control period is recorded in cell W7.

Actual nominal capital expenditure—as-incurred[4]

The actual capex (as-incurred) values for the current regulatory control period (including the final year for the previous regulatory control period) are recorded for each year in rows 31 to 50 (by asset class). Generally, capex falls into three broad categories:

- asset augmentation (e.g. works to enlarge a network or to increase the capability of a network)
- asset replacement (e.g. replacing assets that have passed their useful lives)
- non-network asset (e.g. support the business expenditure).

These inputs are assumed to be in middle of the year terms (based on nominal dollar terms).

[4] Actual capex and actual asset disposals are undertaken evenly over a year and therefore the reported capex values are assumed to be in middle of the year terms. All other input values are assumed to be in end of the year terms.

Actual nominal asset disposals—as-incurred

The actual asset disposal values for each year are recorded in rows 55 to 74. These inputs are assumed to be in middle of the year terms (based on nominal dollar terms).

Actual real net capital expenditure—as-incurred

This section on real net capex does not require inputs to be recorded. For each asset class, actual real net capex values are calculated based on the recorded nominal capex values less asset disposal values, and adjusted for actual inflation. The real net capex (as-incurred) values are displayed in rows 79 to 98 and form part of the roll forward of the RAB in the **Adjustment for previous period** and **Actual RAB roll forward** sheets. These inputs are assumed to be in middle of the year terms (based on the final year of the previous regulatory control period real dollar terms).

Actual nominal capital expenditure—as-commissioned

The actual capex (as-commissioned) values are recorded for each year in rows 103 to 122. These inputs are assumed to be in middle of the year terms (based on nominal dollar terms).

Actual nominal asset disposals—as-de-commissioned

The actual de-commissioned asset values are recorded for each year in rows 127 to 146. These inputs are assumed to be in middle of the year terms (based on nominal dollar terms).

Actual real net capital expenditure—as-commissioned

This section on real net capex does not require inputs to be recorded. For each asset class, actual real net capex values are calculated based on the recorded nominal capex values less the value of de-commissioned assets, and adjusted for actual inflation. The real net capex (as-commissioned) values are displayed in rows 151 to 170 and are used to calculate depreciation in the **Actual RAB roll forward** sheet. These inputs are assumed to be in middle of the year terms (based on the final year of the previous regulatory control period real dollar terms).

Inflation and rate of return

This section records the actual annual inflation rates (based on the consumer price index) over the current regulatory control period and in the final year of the previous regulatory control period. It also records the forecast inflation and WACC rates used in the revenue determinations corresponding to the two regulatory control periods. These parameters are linked to the **Adjustment for previous period** and **Actual RAB roll forward** sheets.

The actual inflation rate for the second last year of the previous regulatory control period needs to be recorded in cell F6 in the **Adjustment for previous period** sheet.

2.2 Adjustment for previous period sheet

The **Adjustment for previous period** sheet adjusts for the final year of the previous regulatory control period the difference between:

1) forecast and actual net capex values

2) forecast and actual assets under construction values (if any).

These adjustments are consistent with the requirements of clause S6A.2.1 of the NER, which specifies that a reconciliation would include adjustments that remove any benefit or penalty on the returns associated with any difference between the forecast and actual capex values for the final year of the previous regulatory control period.

First, this sheet calculates the difference between forecast and actual net capex for the final year of the previous regulatory control period, as well as the aggregate compounded return on that difference (rows 11 to 118). This adjustment is made to the closing RAB at the end of the current regulatory control period in the **Total actual RAB roll forward** sheet. This two-step process is outlined in box 1.

Box 1: Adjusting for actual capex in the final year of the previous regulatory control period

1) Calculating the difference between actual and forecast net capex

Nominal actual net capex (including a half-nominal vanilla WACC allowance)

– Nominal forecast net capex (including a half-nominal vanilla WACC allowance)

= Nominal difference between forecast and actual net capex (adjusted for lagged actual inflation)

2) Calculating the return on the difference and compounding it for each year of the current regulatory control period

Note:

- Nominal forecast net capex = forecast net capex allowed in the final year of the previous regulatory control period.
- Nominal actual net capex = actual net capex incurred during the final year of the previous regulatory control period.
- Adjustments for lagged actual inflation are to ensure that the actual net capex is consistent with the forecast net capex in nominal terms. The actual inflation rate is required as an input to cell F6.
- The return on the difference between actual and forecast net capex is calculated by applying the nominal vanilla WACC (adjusted for actual inflation) applicable to the current regulatory control period (as determined in the current revenue determination).
- Each of these adjustments is made to the final closing RAB for the current regulatory control period in the **Total actual RAB roll forward** sheet.

Second, this sheet calculates the difference between forecast and actual assets under construction values for the final year of the previous regulatory control period, as well as the aggregate compounded return on that difference (rows 122 to 229). This adjustment is also made to the closing RAB at the end of the current regulatory control period in the **Total actual RAB roll forward** sheet. This two-step process is outlined in box 2.

Box 2: Adjusting for actual assets under construction in the final year of the previous regulatory control period

1) Calculating the difference between actual and forecast assets under construction

Nominal actual assets under construction

– Nominal forecast assets under construction

= Nominal difference between actual and forecast assets under construction

2) Calculating the return on the difference and compounding it for each year of the current regulatory control period

Note:

- Forecast assets under construction = forecast assets under construction allowed in the final year of the previous regulatory control period.
- Actual assets under construction = actual assets under construction incurred during the final year of the previous regulatory control period.
- The return on the difference between actual and forecast assets under construction is calculated by applying the nominal vanilla WACC (adjusted for actual inflation) applicable to the current regulatory control period (as determined in the current revenue determination).
- Each of these adjustments is made to the final closing RAB for the current regulatory period in the **Total actual RAB roll forward** sheet.

Finally, this sheet uses the opening RAB for the final year of the previous regulatory control period to roll forward for forecast net capex, regulatory depreciation as well as any specific adjustments that may be required as a result of the previous revenue determination (e.g. transition to a partially as-incurred approach for recognising capex (rows 299 to 363) to determine the closing RAB for that year. This adjustment process is set out in box 3. Because inflation during the final year of the previous regulatory control period is known at the time the previous revenue determination was made, there is no need to make an adjustment in this sheet for actual inflation when rolling forward the RAB to the end of the final year of the previous regulatory control period.

Box 3: Roll forward of the final year of the previous regulatory control period and calculating the opening RAB for the current regulatory control period

Calculating the opening RAB for the current regulatory control period
Opening RAB for the final year of the previous regulatory control period + Nominal forecast net capex – Nominal forecast regulatory depreciation + Nominal prudent additional capex allowance from the previous regulatory control period (if any) + Nominal foregone return on prudent additional capex allowance from the previous regulatory control period (if any) + Nominal forecast assets under construction (if any) **= Opening RAB for the first year of the current regulatory control period**
Where: ▪ Nominal forecast net capex = forecast net capex allowed for the final year of the previous regulatory control period. ▪ Nominal forecast regulatory depreciation = forecast straight-line depreciation – forecast inflation adjustment on the opening RAB. ▪ Forecast assets under construction = forecast assets under construction for the final year of the previous regulatory control period. This may be relevant for some TNSPs transitioning to recognising capex on a partially as-incurred approach. ▪ The prudent additional capex allowance and the foregone return on that amount are one-off adjustments to the closing RAB for the previous regulatory control period that may be relevant for some TNSPs.

Figure 2 provides an example of the **Adjustment for previous period** sheet.

Figure 2: Adjustment for previous period sheet

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2		**Adjustments for Previous Regulatory Control Period**										
3												
4		**Year**				**2003-04**	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**
5												
6		Actual CPI Inflation Rate				2.50%	3.00%					
7		Nominal Vanilla WACC (fixed real time varying)						9.44%	9.97%	8.42%	8.82%	9.48%
8												
9		**Nominal Adjustments for Difference Between Forecast and Actual Capex**										
10												
11		Nominal Forecast Net Capex (previous regulatory control period)					40.00					
32												
33		Nominal Actual Net Capex					70.01					
54												
55		Nominal Difference Between Actual and Forecast Net Capex					29.67					
76												
77		Compounded Return on Difference - Net Capex						2.80	3.24	3.01	3.41	3.99
118		*Total Return at End of Regulatory Period*										16.45
119												
120		**Nominal Adjustments for Difference Between Forecast and Actual Assets Under Construction**										
121												
122		Nominal Forecast Assets Under Construction (previous regulatory period)					100.00					
143												
144		Nominal Actual Assets Under Construction					103.00					
165												
166		Nominal Difference Between Actual and Forecast Assets Under Construction					3.00					
187												
188		Compounded Return on Difference - Assets Under Construction						0.28	0.33	0.30	0.35	0.40
229		*Total Return at End of Regulatory Period*										1.66
230												
231		**Nominal Roll Forward for Final Year of Previous Regulatory Control Period**										
232												
233		Nominal Opening Regulatory Asset Base					2,400.00	2,630.00				
254												
255		Nominal Forecast Net Capex					40.00					
276												
277		Nominal Forecast Regulatory Depreciation				-	30.00					
298												
299		Nominal Prudent Additional Capex Allowance					120.00					
320												
321		Nominal Foregone Return on Prudent Additional Capex					-					
342												
343		Nominal Forecast Assets Under Construction					100.00					
364												

Nominal adjustments for difference between forecast and actual capex

This section calculates the difference between forecast and actual capex for the final year of the previous regulatory control period and determines the compounded return on that difference. The process involved is based on that depicted in box 1.

The nominal forecast net capex values for each asset class in the final year of the previous regulatory control period are displayed in rows 12 to 31. The values are sourced from the **Input** sheet. Row 11 displays the sum of each asset class values for rows 12 to 31.

The nominal actual net capex values (including a half WACC allowance) for each asset class in the final year of the previous regulatory control period are calculated in rows 34 to 53. Given the timing assumption that capex on average takes place halfway through the year, a half-nominal vanilla WACC is applied to the actual net capex for

each asset class to 'gross-up' the actual values.[5] Row 33 displays the sum of each asset class calculations for rows 34 to 53.

The differences between the actual and forecast net capex values for each asset class are calculated in rows 56 to 75. Row 55 displays the sum of each asset class calculations for those rows.

Finally, in rows 77 to 117 a nominal vanilla WACC (row 7) is applied to calculate the return on the difference, which is compounded to the end of the current regulatory control period.[6] The total compounded return at the end of the current regulatory control period is displayed in row 118. This value is linked to the **Total actual RAB roll forward** sheet.

Nominal adjustments for difference between forecast and actual assets under construction

This section calculates the difference between forecast and actual assets under construction values for the final year of the previous regulatory control period and determines the compounded return on that difference. The process involved is based on that depicted in box 2.

The nominal forecast assets under construction values for each asset class in the final year of the previous regulatory control period are displayed in rows 123 to 142. These values are sourced from the **Input** sheet. Row 122 displays the sum of each asset class values for rows 123 to 142.

The nominal actual assets under construction values for each asset class in the final year of the previous regulatory control period are displayed in rows 145 to 164. These values are sourced from the **Input** sheet. Row 144 displays the sum of each asset class values for rows 145 to 164.

The differences between the actual and forecast assets under construction values for each asset class are calculated in rows 167 to 186. Row 166 displays the sum of each asset class calculations for those rows.

Finally, in rows 188 to 228 a nominal vanilla WACC (row 7) is applied to calculate the return on the difference, which is compounded to the end of the current regulatory control period. The total compounded return at the end of the current regulatory control period is displayed in row 229. This value is linked to the **Total actual RAB roll forward** sheet.

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5 AER, *Roll forward model: Final decision*, September 2007. See section 4.3.1 which discusses the need for the application of a half-nominal WACC allowance.

6 The nominal vanilla WACC is based on a fixed real time varying WACC—that is, a fixed real vanilla WACC adjusted for actual inflation.

Nominal roll forward for final year of previous regulatory control period

This section calculates the closing RAB for the final year of the previous regulatory control period, based on the net capex and regulatory depreciation forecasts for that year (including any relevant adjustments that may be required—e.g. assets under construction, prudent additional capex allowance and foregone return on prudent additional capex). The process involved is based on that depicted in box 3.

The sum of the opening RAB values for the final year of the previous regulatory control period (cells G234 to G253), which are sourced from the **Input** sheet, is shown in cell G233. The sum (cell G255) of the forecast net capex values shown in cells G256 to G275 is rolled into the opening RAB for the final year of the previous regulatory control period. The sum (cell G277) of the nominal forecast regulatory depreciation values shown in rows 278 to 297 is deducted from the opening RAB for the final year of the previous regulatory control period.[7]

The nominal prudent additional capex allowance from the previous regulatory control period (if any), the foregone return on that amount (if any), and the nominal forecast assets under construction (if any) are included (rows 299 to 363) as additions to determine the closing RAB for the final year of the previous regulatory control period. This becomes the opening RAB for the first year of the current regulatory control period.

Nominal opening RAB

The nominal opening RAB for the first year of the current regulatory control period (cell H233) is calculated based on the forecast capex, regulatory depreciation values and any additional adjustments that may be required—e.g. assets under construction, prudent additional capex allowance and foregone return on prudent additional capex. This opening RAB appears again in the **Actual RAB roll forward** sheet so that the roll forward of the RAB can be undertaken for the current regulatory control period.

2.3 Actual RAB roll forward sheet

The **Actual RAB roll forward** sheet calculates the nominal closing RAB (which becomes the opening RAB) for each year of the current regulatory control period using the partially as-incurred and as-commissioned approaches. Under clause S6A.2.1 of the NER, in rolling forward the RAB from year to year during the current regulatory control period, the AER must have regard to actual data such as capex and inflation outcomes. Accordingly, the opening RAB (based on either the partially as-incurred or as-commissioned approaches) for the first year of the current regulatory

[7] Nominal regulatory depreciation is based on the nominal straight-line depreciation less the inflation applied to the opening RAB.

control period is rolled forward for actual net capex and regulatory depreciation values, and adjusted for actual inflation.

It is possible that a TNSP may overspend or underspend the capex allowance during the current regulatory control period. Such variances may be caused by unforeseen increases or decreases in demand, higher than expected costs of construction or forecasting error. The RFM handles such variances by adjusting the closing RAB to reflect the actual capex and actual regulatory depreciation for the year. On the basis of the incentive framework set out in chapter 6A of the NER, there is no additional adjustment in rolling forward the RAB to account for the above/below forecast returns resulting from the respective under or overspend in the current regulatory control period.

For example, in relation to a lower than forecast capex, the TNSP retains both the returns on and of capital associated with the current regulatory control period. Conversely, in relation to a higher than forecast capex, the TNSP is not compensated for the returns on and of capital foregone associated with the current regulatory control period.

The process for rolling forward the RAB from year to year under both the partially as-incurred and as-commissioned approaches is set out in box 4.[8]

[8] For illustrative purposes this is based on a standard five-year regulatory control period.

Box 4: Rolling forward the RAB in the current regulatory control period

Rolling forward actual net capex and depreciation amounts into the RAB

Opening RAB for year 1

\+ Nominal actual net capex for year 1

– Nominal actual regulatory depreciation for year 1

= Closing RAB for year 1

= Opening RAB for year 2

\+ Nominal actual net capex for year 2

– Nominal actual regulatory depreciation for year 2

= Closing RAB for year 2

= Opening RAB for year 3

…

= Closing RAB for year 5

= Interim closing RAB for the current regulatory control period

Where:

- Opening RAB for year 1 = closing RAB for the final year of the previous regulatory control period, which was calculated in accordance with box 1.
- Nominal actual net capex = real actual net capex (including half-nominal vanilla WACC allowance) adjusted for actual inflation.
- Nominal actual regulatory depreciation = Nominal actual straight-line depreciation – actual inflation adjustment on the opening RAB.

Note:

The interim closing RAB for the current regulatory period becomes the opening RAB for the next regulatory period after the final adjustments for the previous regulatory control period have been made (these adjustments are included in the **Total actual RAB roll forward** sheet—see box 5 for a description).

Figure 3 provides an example of the **Actual RAB roll forward** sheet.

Figure 3: Actual RAB roll forward sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2			**Asset Base Roll Forward**										
3													
4			**Year**				**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**
5													
6			Actual CPI Inflation Rate				3.00%	2.94%	3.44%	1.98%	2.36%	2.98%	3.00%
7			Actual CPI (one year lagged)				1.0000	1.0300	1.0603	1.0968	1.1185	1.1449	1.1790
8													
9			**Asset Values ($m Real 2004-05)**										
10													
11			Real Actual Net Capex - As Incurred					62.97	18.79	56.01	24.25	33.82	-
32													
33			Real Actual Net Capex - As Commissioned					12.19	71.21	74.05	42.90	18.28	-
54													
55			Real Actual Straight-line Depreciation				-	87.33	- 87.43	- 88.82	- 90.60	- 91.35	-
316													
317			**Asset Values – Partially As Incurred ($m Nominal)**										
318													
319			Nominal Opening Regulatory Asset Base				2,400.00	2,630.00	2,682.20	2,701.71	2,719.26	2,709.21	2,724.16
340													
341			Nominal Actual Net Capex				40.00	64.86	19.92	61.43	27.12	38.71	-
362													
363			Nominal Actual Regulatory Depreciation			-	30.00	- 12.66	- 0.42	- 43.88	- 37.17	- 23.76	-
384													
385			Nominal Prudent Additional Capex Allowance				120.00						
406													
407			Nominal Foregone Return on Prudent Additional Capex				-						
428													
429			Nominal Forecast Assets Under Construction				100.00						
450													
451													
452													
453			Nominal Actual Straight-line Depreciation			-	102.00	- 89.95	- 92.70	- 97.41	- 101.33	- 104.58	-
474													
475			Nominal Actual Inflation on Opening RAB				72.00	77.29	92.29	53.54	64.16	80.82	-
496													
497			**Asset Values – As Commissioned ($m Nominal)**										
498													
499			Nominal Opening Regulatory Asset Base				2,400.00	2,530.00	2,526.96	2,596.70	2,631.96	2,640.71	2,635.83
520													
521			Nominal Actual Net Capex				40.00	12.55	75.50	81.22	47.99	20.93	-
542													
543			Nominal Actual Regulatory Depreciation			-	30.00	- 15.60	- 5.76	- 45.96	- 39.23	- 25.81	-
564													
565			Nominal Prudent Additional Capex Allowance				120.00						
586													
587			Nominal Foregone Return on Prudent Additional Capex				-						
608													
609													
610													
611			Nominal Actual Straight-line Depreciation			-	102.00	- 89.95	- 92.70	- 97.41	- 101.33	- 104.58	-
632													
633			Nominal Actual Inflation on Opening RAB				72.00	74.36	86.95	51.46	62.10	78.77	-
654													

Real asset values

Real asset values are displayed in rows 11 to 315. The real actual net capex values (as-incurred, including a half-nominal vanilla WACC allowance) for each asset class are displayed in rows 12 to 31.[9] Row 11 displays the sum of each asset class values for those rows. The real actual net capex values (as-commissioned, including a half-nominal vanilla WACC allowance) for each asset class are displayed in rows 34 to 53. Row 33 displays the sum of each asset class values for those rows.

The capex values (as-incurred and as-commissioned) for the current regulatory control period (sourced from the **Input** sheet) are those provided by the TNSPs to the

[9] The half-nominal vanilla WACC is based on a fixed real time varying WACC—that is, a fixed real vanilla WACC adjusted for actual inflation.

AER for the purpose of rolling forward their asset base to the end of the current regulatory control period.

The real actual straight-line depreciation values for each asset class (rows 56 to 315) are calculated based on the opening RAB, actual net capex values (as-commissioned) and asset lives from the **Input** sheet. Row 55 displays the sum of each asset class calculations for those rows.

Nominal asset values—partially as-incurred

Partially as-incurred nominal asset values are displayed in rows 319 to 495. The nominal opening RAB values for each year are displayed in row 319. The nominal opening RAB for the first year of the current regulatory control period (cell G319) is the same value as that calculated in the **Adjustment for previous period** sheet in accordance with box 3.

The nominal opening RAB for the remaining years of the current regulatory control period is calculated in accordance with box 4. The nominal actual net capex values (as-incurred) for each year (row 341) is equal to the real actual net capex values (as-incurred) (row 11) indexed by actual inflation (row 7). The nominal actual regulatory depreciation values (row 363) are calculated as nominal actual straight-line depreciation (row 453) less the actual inflation applied to the opening RAB (row 476).

Nominal asset values—as-commissioned

As-commissioned nominal asset values are displayed in rows 499 to 653. The nominal opening RAB values for each year are displayed in row 499. The nominal opening RAB for the first year of the current regulatory control period (cell G499) is calculated in accordance with box 3, but excluding any adjustment for assets under construction in the previous regulatory control period.

The nominal opening RAB for the remaining years of the current regulatory control period is calculated in accordance with box 4. The nominal actual net capex values (as-commissioned) for each year (row 521) are equal to the real actual net capex values (as-commissioned) (row 33) indexed by actual inflation (row 7). The nominal actual regulatory depreciation (row 543) is calculated as nominal actual straight-line depreciation (row 611) less the actual inflation applied to the opening RAB (row 633).

2.4 Total actual RAB roll forward sheet

The **Total actual RAB roll forward** sheet brings together the relevant data from the **Adjustment for previous period** and **Actual RAB roll forward** sheets to calculate the final closing RAB for the current regulatory control period in nominal terms. The sheet is separated into two sections—the first section rolls forward the RAB under the partially as-incurred approach to recognising capex and the second section rolls forward the RAB under the as-commissioned approach to recognising capex.

Partially as-incurred RAB roll forward

Under the partially as-incurred approach to recognising capex, row 7 calculates the opening RAB values for each year of the current regulatory control period (which is

based on the interim closing RAB (partially as-incurred) in row 141). The calculations are based on data sourced from the **Actual RAB roll forward** sheet. Similarly, the nominal actual net capex (row 29) and regulatory depreciation (row 51) values (including any additional adjustments that may be required—e.g. prudent additional capex allowance (row 73), foregone return on prudent additional capex (row 95) and assets under construction (row 117)) are sourced from the **Actual RAB roll forward** sheet.

Rows 163 to 249 represent the required adjustments based on the final year of the previous regulatory control period and are sourced from the **Adjustment for previous period** sheet. These adjustments include:

- the difference between forecast and actual net capex (and a compounded return on that difference)
- the difference between forecast and actual assets under construction (and a compounded return on that difference).

The process for calculating the final closing RAB (partially as-incurred) for the current regulatory control period is set out in box 5.

Box 5: Adjusting for the final year of the previous regulatory control period (partially as-incurred)

Calculating the differences between actual net capex and forecast net capex, actual assets under construction and forecast assets under construction, and the compounded return on the differences
Interim closing RAB (partially as-incurred) for the current regulatory control period + Difference between nominal actual net capex and forecast nominal net capex (adjusted for actual inflation) + Compounded return on that difference for net capex + Difference between nominal actual assets under construction and nominal forecast assets under construction + Compounded return on that difference for assets under construction **= Closing RAB (partially as-incurred) for the current regulatory control period** **= Opening RAB (partially as-incurred) for the first year of the next regulatory control period**
Note: ▪ The opening RAB (partially as-incurred) for the first year of the next regulatory control period becomes an input into the PTRM for the purposes of determining the return on capital for the next regulatory control period.

The closing RAB (partially as-incurred) for the current regulatory control period is shown in cell L251. This value becomes the opening RAB (partially as-incurred) for the next regulatory control period and is used as an input into the PTRM for calculating the allowed return on capital in the next revenue determination. A break down of the closing RAB values by asset classes are displayed in rows 252 to 271.

As-commissioned RAB roll forward

Under the as-commissioned approach to recognising capex, row 275 calculates the opening RAB values for each year of the current regulatory control period (which is based on the interim closing RAB (as-commissioned) in row 387). The calculations are based on data sourced from the **Actual RAB roll forward** sheet. Similarly, the nominal actual net capex (row 297) and regulatory depreciation (row 319) values (including any additional adjustments that may be required—e.g. prudent additional capex allowance (row 341) and foregone return on prudent additional capex (row 363)) are sourced from the **Actual RAB roll forward** sheet.

Rows 409 to 451 represent the required adjustments based on the final year of the previous regulatory control period and are sourced from the **Adjustment for previous period** sheet. This adjustment includes the difference between forecast and actual net capex (and a compounded return on that difference).

The process for calculating the final closing RAB (as-commissioned) for the current regulatory control period is set out in box 6.

Box 6: Adjusting for the final year of the previous regulatory control period (as-commissioned)

Calculating the difference between actual net capex and forecast net capex, and the compounded return on the difference
Interim closing RAB (as-commissioned) for the current regulatory control period + Difference between nominal actual net capex and forecast nominal net capex (adjusted for actual inflation) + Compounded return on that difference for net capex **= Closing RAB (as-commissioned) for the current regulatory control period** **= Opening RAB (as-commissioned) for the first year of the next regulatory control period**
Note: ▪ The opening RAB (as-commissioned) for the first year of the next regulatory control period becomes an input into the PTRM for the purposes of determining the return of capital (depreciation) for the next regulatory control period.

The closing RAB (as-commissioned) for the current regulatory control period is shown in cell L453. This value becomes the opening RAB (as-commissioned) for the next regulatory control period and is used as an input into the PTRM for calculating the allowed return of capital (depreciation) in the next revenue determination. A break down of the closing RAB values by asset classes are displayed in rows 454 to 473.

Figure 4 provides an example of the **Total actual RAB roll forward** sheet.

Figure 4: Total actual RAB roll forward sheet

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2			**Total Asset Base Roll Forward**									
3												
4			**Year**				**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**
5			**Asset Values – Partially As Incurred ($m Nominal)**									
6												
7			Nominal Opening Regulatory Asset Base				2,400.00	2,630.00	2,682.20	2,701.71	2,719.26	2,709.21
28												
29			Nominal Actual Net Capex				40.00	64.86	19.92	61.43	27.12	38.71
50												
51			Nominal Actual Regulatory Depreciation			-	30.00	- 12.66	- 0.42	- 43.88	- 37.17	- 23.76
72												
73			Nominal Prudent Additional Capex Allowance				120.00					
94												
95			Nominal Foregone Return on Prudent Additional Capex				-					
116												
117			Nominal Forecast Assets Under Construction				100.00					
138												
139			**Interim Closing Regulatory Asset Base – Partially As Incurred**									
140												
141			Interim Closing Regulatory Asset Base				2,630.00	2,682.20	2,701.71	2,719.26	2,709.21	2,724.16
162												
163			Difference Between Actual and Forecast Net Capex									29.67
184												
185			Return on Difference - Net Capex									16.45
206												
207			Difference Between Actual and Forecast Assets Under Construction									3.00
228												
229			Return on Difference - Assets Under Construction									1.66
250												
251			**Closing Regulatory Asset Base – Partially As Incurred**									**2,774.94**
272												
273			**Asset Values – As Commissioned ($m Nominal)**									
274												
275			Nominal Opening Regulatory Asset Base				2,400.00	2,530.00	2,526.96	2,596.70	2,631.96	2,640.71
296												
297			Nominal Actual Net Capex				40.00	12.55	75.50	81.22	47.99	20.93
318												
319			Nominal Actual Regulatory Depreciation			-	30.00	- 15.60	- 5.76	- 45.96	- 39.23	- 25.81
340												
341			Nominal Prudent Additional Capex Allowance				120.00					
362												
363			Nominal Foregone Return on Prudent Additional Capex				-					
384												
385			**Interim Closing Regulatory Asset Base – As Commissioned**									
386												
387			Interim Closing Regulatory Asset Base				2,530.00	2,526.96	2,596.70	2,631.96	2,640.71	2,635.83
408												
409			Difference Between Actual and Forecast Net Capex									29.67
430												
431			Return on Difference - Net Capex									16.45
452												
453			**Closing Regulatory Asset Base – As Commissioned**									**2,681.95**
474												

2.5 Tax value roll forward sheet

The **Tax value roll forward** sheet calculates the nominal opening tax values for each year of the current regulatory control period by taking the opening tax value for the final year of the previous regulatory control period and rolling forward for actual net capex (as-commissioned) and tax depreciation values. Since the calculations are based on actual nominal data the roll forward of the tax values does not require any adjustments for inflation.

The process for rolling forward the tax asset values is set out in Box 7.[10]

Box 7: Rolling forward the tax asset values

Rolling forward actual net capex and depreciation values into the tax asset base
Opening tax asset value for the final year of the previous regulatory control period + Nominal actual net capex for the final year of the previous regulatory control period – Nominal actual tax depreciation for the final year of the previous regulatory control period **= Closing tax asset value for the final year of the previous regulatory control period** **= Opening tax asset value for year 1 of the next regulatory control period** + Nominal actual net capex for year 1 – Nominal actual tax depreciation for year 1 **= Closing tax asset value for year 1 of the next regulatory control period** **= Opening tax asset value for year 2 of the next regulatory control period** **…** **= Closing tax asset value for year 5 of the next regulatory control period** **= Opening tax asset value for the next regulatory control period**
Where: ▪ Nominal actual net capex = nominal actual capex – nominal actual asset disposals. ▪ Nominal actual tax depreciation = nominal actual straight-line tax depreciation. Note: The closing tax asset value for the current regulatory control period becomes the opening tax asset value for the next regulatory control period.

Figure 5 provides an example of the **Tax value roll forward** sheet.

[10] For illustrative purposes this is based on a standard five-year regulatory control period.

Figure 5: Tax value roll forward sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2		**Tax Asset Value Roll Forward**											
3													
4		**Year**					**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**
5		**Tax Values ($m Nominal)**											
6													
7		Opening Tax Asset Values					2,400.00	2,376.33	2,287.98	2,259.52	2,235.51	2,177.35	2,092.30
28													
29		Actual Net Capex					75.00	12.00	72.00	78.00	46.00	20.00	-
50													
51		Actual Tax Depreciation					- 98.67	- 100.35	- 100.46	- 102.02	- 104.16	- 105.05	-
332													

Opening tax asset values

Rows 8 to 27 roll forward the tax asset values for each asset class by taking the previous year's nominal opening tax asset value, then adding nominal actual net capex (as-commissioned) and subtracting nominal actual tax depreciation.

Based on the sum of each asset class calculations for those rows, the opening tax asset value for each year of the current regulatory control period (including the final year of the previous regulatory control period) is displayed in row 7. These values are calculated in accordance with box 7. The opening tax asset value for the next regulatory control period is shown in cell M7. This value is used as an input into the PTRM for calculating the tax depreciation in the next revenue determination. A break down of the closing tax asset values by asset classes are displayed in cells M8 to M27.

Actual net capex

The actual net capex values for each asset class (rows 29 to 49) are calculated by taking nominal actual capex (as-commissioned) from the **Input** sheet (rows 103 to 123) and subtracting nominal actual de-commissioned assets from the same sheet (rows 127 to 147). Row 29 displays the sum of each asset class calculations for rows 28 to 49.

Actual tax depreciation

The actual tax depreciation values for each asset class (rows 52 to 331) are calculated based on the nominal opening tax asset values, nominal actual net capex (as-commissioned) values and tax asset lives, in accordance with the straight-line method. Row 51 displays the sum of each asset class calculations for those rows.

2.6 Asset lives roll forward

The **Asset lives roll forward** sheet calculates the average remaining lives of each asset class at the end of the current regulatory control period using a weighted average method. These weighted average remaining lives are used as inputs to the PTRM for the next regulatory control period to calculate the depreciation values in the next revenue determination. The inputs for these calculations are sourced from the **Actual RAB roll forward** sheet.

The process for calculating the weighted average remaining lives is set out in box 8.

Box 8: Calculating the weighted average remaining asset lives

Calculating the weighted average remaining asset lives for the end of the current regulatory control period by asset class
Opening RAB for year 1 – Total real actual depreciation on opening RAB = **Closing capital value of opening RAB** **Real actual net capex for year 1** – Total real actual depreciation on net capex for year 1 = **Closing capital value of net capex for year 1** **…** Sum of closing capital values = **Total closing capital value for the asset class**
Opening RAB average remaining life – length of current regulatory control period = **Closing average remaining life of opening RAB** Asset class standard life – number of years of depreciation applied to capex for year 1 = **Closing average remaining life of capex for year 1** **…**
Closing capital value of opening RAB ÷ Total closing capital value for the asset class × Closing average remaining life of opening RAB + Closing capital value of net capex for year 1 ÷ Total closing capital value for the asset class × Closing average remaining life of capex for year 1 + **…** = **Weighted average remaining life for the asset class**

Where:

- Opening RAB for year 1 = closing RAB for the final year of the previous regulatory control period
- Total real actual depreciation on opening RAB = the sum of the real actual depreciation on opening RAB calculated for the current regulatory control period
- Real actual net capex = real actual net capex (including half-nominal vanilla WACC allowance)
- Total real actual depreciation on net capex = the sum of the real actual depreciation on net capex calculated for the current regulatory control period
- The opening RAB average remaining life is that used for the current revenue determination.
- The asset class standard life is that used for the current revenue determination.

In calculating the weighted average remaining lives for each asset class, the remaining life of each capital stream (representing the opening asset value or any capex value in each year of the regulatory control period) is weighted by the associated level of closing capital value (column E) as a proportion of the total closing capital value of the asset class. The resulting average remaining lives for each capital stream and the total weighted average remaining life for the asset class are shown in column F. A break down of the weighted average remaining lives by asset classes are displayed in cells F19 to F285.

Closing tax values and average tax remaining lives are calculated using inputs from the **Tax value roll forward** sheet. The weighted average tax remaining lives are calculated similar to the process described in Box 8.[11]

In calculating the weighted average tax remaining lives for each asset class, the tax remaining life of each tax capital stream (representing the opening tax asset value or any capex value in each year of the regulatory control period) is weighted by the associated level of closing tax capital value (column J) as a proportion of the total closing tax capital value of the asset class. The resulting average tax remaining lives for each tax capital stream and the total weighted average tax remaining life for the asset class are shown in column K. A break down of the weighted average remaining lives by asset classes are displayed in cells K19 to K285.

Figure 6 provides an example of the **Asset lives roll forward** sheet.

[11] The calculations for the weighted average tax remaining lives starts in the final year of the previous regulatory control period.

Figure 6: Asset lives roll forward sheet

	A	B	C	D	E	F	G	H	I	J	K
1											
2		**Average Remaining Asset Lives Roll Forward**									
3											
4											
5		**Closing Asset Values and Lives**			**($m Real 2004-05)**	**(Age in years)**				**($m Nominal)**	**(Age in years)**
6					Asset Value	Average Remaining Life				Tax Value	Average Tax Remaining Life
19			*Transmission lines*		*991.31*	*18.50*				*753.44*	*15.70*
33			*Substations*		*790.60*	*26.39*				*711.86*	*21.02*
47			*Land*		*621.19*	-				*627.00*	-
61			-		-	-				-	-
75			-		-	-				-	-
89			-		-	-				-	-
103			-		-	-				-	-
117			-		-	-				-	-
131			-		-	-				-	-
145			-		-	-				-	-
159			-		-	-				-	-
173			-		-	-				-	-
187			-		-	-				-	-
201			-		-	-				-	-
215			-		-	-				-	-
229			-		-	-				-	-
243			-		-	-				-	-
257			-		-	-				-	-
271			-		-	-				-	-
285			-		-	-				-	-
286											